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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/802,835

03/18/2004

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066829-5102

4262

9629 7590 05/29/2009  
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EXAMINER

HAN, QI

ART UNIT

PAPER NUMBER

2626

MAIL DATE

DELIVERY MODE

05/29/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/802,835	<b>Applicant(s)</b> FOURQUIN ET AL.	
	<b>Examiner</b> QI HAN	<b>Art Unit</b> 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03/11/2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

#### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

#### ***Response to Amendment***

3. This communication is responsive to the applicant's amendment and RCE both filed on 03/11/2009.

#### ***Response to Arguments***

4. Applicant's arguments filed on 03/11/2009 with respect to the claim rejection under 35 USC 112 and/or 103, have been fully considered but they are not persuasive.

5. In response to applicant's arguments regarding request for interview that "the Office's unwillingness to discuss the specifics of Applicant's claimed invention in a written...", it should be pointed out that this **unwillingness** blame lacks evidence and is not a proper response to the

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examiner's requirement for clarifying or correcting the applicant's claimed or disclosed terms or language. It is also noted that, for more effective prosecution of the application, the examiner had further suggested that, in the previous office action, "If the applicant (such as attorney) is not familiar with technical background of the instant application, it is suggested discussing the related issue(s) with the inventor(s) who is/are supposed to have at least the same skill level as the ordinary skill in the art, and then contacting the examiner for an interview when necessary." (see previous office, bridge paragraph of pages 4-5). Finally, it is be pointed out that the examiner has to meet certain dead line for processing the applications, so that some time he can not find out an interview request within an amendment until it is too late (like this case). Therefore, the applicant is suggested to make a telephone call for arranging an interview as soon as the applicant receives this (or other) office action.

6. The applicant's arguments regarding disclosure objection a and d, are not persuasive, because the arguments do not make the objected contents clear and/or no amendment to clarify the contents (also see detail the corresponding objections below).

7. In response to the applicant's arguments regarding claim rejection under 35 USC 112,1<sup>st</sup> (Remarks: page 11, p4 to page 12, p1), it is noted that the enablement rejection is based on the applicant's disclosure, wherein the examiner considered the three respects together and further adjudged whether it required undue effort.

As rejected, the examiner stated that: "Firstly, it is noted that the disclosure "said power peak corresponding to the fundamental frequency of a vowel" (page 6, line 31-32) is **incorrect**

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**and inefficient** to obtain a fundamental frequency of the signal, and nowhere in the specification specifically describes how to obtain/extract a fundamental frequency of the speech signal”. The examiner agrees that FFT can be used to detect “the presence of a power peak in the frequencies constituting the spectrum” (specification: page 6, line 29-25), but, the power peak does not mean or correspond to “the fundamental frequency”. In addition, the examiner’s own experience evidenced that in most of time and with various reasons, a power peak is only an nth (wherein n is unknown) harmonic of a fundamental frequency or a formant frequency, so that extraction of a fundamental frequency is much more complicated than detecting a power peak. That is why the examiner pointed out that the statement “is incorrect and inefficient to obtain a fundamental frequency of the signal”. The examiner has no disagreement that there is common technique (i.e. well known art) used in the art for the extraction the fundamental frequency via FFT. The problem is that the applicant **expressly** says the **incorrect** statement in the specification, so that the examiner has reasonable doubt and responsibility to challenge enablement of the claimed invention.

Regarding second aspect, the rejection states: “it is well known in the art that the **range** of fundamental frequency of human speech is much narrower than that of musical instruments, so that the replacement cannot be **easily** implemented by one of ordinary skill in the art without solving this range problem; otherwise, the replacement cannot be enabled or lacks meaningful operation. There is no evidence in the specification to specifically describe how to solve this problem”. It is known in the art that the fundamental frequencies of both speech signal and music signal are dynamically changed in different range, speed and trend, so that the replacement, in actual and practical application, involves much more complicated alignments of

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fundamental frequency itself and its harmonics than just a simple “replacing the fundamental frequency of said speech signal by the fundamental frequency associated with a note of said music signal one frequency with another” as claimed. It should be clear that this enablement issue is related to the invention’s objective that is aimed to offer some meaningful service (i.e. in light of the specification: page 2, lines 20-23), **not** whatever mixed junk sound produced. For example, it cannot be enable one of skill in the art to replace a slow changed fundamental frequency around 100 Hz of a voiced speech signal having a first formant frequency around 300 Hz with a fast moved fundamental frequency between 500-1000 Hz of a music signal to provide meaningful service by using a simple replacement of one frequency with another as claimed. Similar results are also applied to the situation of big difference(s) between speech and music signals in terms of various combinations of fundamental frequency range, speed and trend.

Regarding third aspect, the rejection states: “it is noted that the claim limitation (replacing frequency) conflicts with the specification disclosure that states “a proportion Y% of a **musical** sinusoidal signal deduced from the signal S2 **is substituted** for a proportion X% of the speech sinusoidal signal” (replacing percentage) (page 5, line 35 to page 6, line 2)”. In this case, as rejected, the examiner pointed out that the replacing frequency conflicts with replacing percentage of the sinusoidal signal because they cannot be compatible, so that raising reasonable doubt as part of the enablement problem of the claimed invention is proper.

For above reasons, considering all three aspects **together**, the claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention, **without undue experimentation**. Therefore, the rejection is proper.

8. In response to the applicant's arguments regarding claim rejection under 35 USC 112,2<sup>nd</sup> (Remarks: page 12, p2-4), it is noted that the applicant's argument has referred the limitation to a specific disclosure, i.e. the abstract (see Remarks: page 12, p4), but it just repeats the same claim language, which is not definition at all. In fact, no clear definition of the term can be found in the specification and the applicant's argument also failed to answer what the term really is. The examiner further tried the text search for the limitation in USPTO database and NPL(Non-patent literature, but no definition or description can be found, which is confirmed that the limitation is not commonly accepted/used term in the art. According to MPEP (2111.01.IV), "an applicant is entitled to be his or her own lexicographer" by "clearly setting forth a definition of the term" and a special meaning assigned to a term "must be sufficiently clear in the specification that any departure from common usage would be so understood by a person of the experience in the field of the invention". However, the applicant failed to do so. Therefore, it is believed that the rejection of claims under 35 USC 112 2<sup>nd</sup> paragraph (indefinite) is proper.

9. Response to the arguments regarding rejection under 35 USC 103:

In response to the applicant's arguments (Remarks: page 12, paragraph 5 to page 13, paragraph 3) regarding rejection of claims 1 and 11 under 35 USC 103, that "Pawate (primary reference) already employs a standard format, i.e. a CD format, Pawate would not have been motivated to provided to a compatible standard format...as alleged by the Office action" and "there is no motivation to combine Pawate and Boss et al." (Remarks: page 13, p2-p3), the examiner respectfully disagrees with the applicant's arguments and has a different view of prior

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art teachings and obviousness/motivation of combining the references. It is noted that the test for obviousness/motivation is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). It is also noted that obviousness (or motivation) for combining the references could be for the same purpose as taught from a primary reference, and/or for the different purpose(s) and from different references, and/or common knowledge in the art, as long as one of ordinary skill in the art would recognize and implement the combination. Finally, as stated in the rejection, the examiner states that “it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify PAWATE by providing a compatible standard digital format, such as MIDI, for representing a speech and/or music signals, as taught by BOSS, for the purpose (motivation) of efficiently representing, storing and transmitting sound/audio signal(s) including music and/or speech signals (BOSS: col. 2, lines 27-29 and 56-61; col. 13, lines 58-61)”, which provides clearly and particularly reasonable analysis for obviousness/motivation of combining the references. Therefore the prior art rejection based on the teachings of combined references is proper.

### ***Specification***

10. The disclosure is objected to because of the following:

(i) on page 3, lines 2, 15, 18, the term "digital **sung** signal" is unclear or confused. Is that means “digital sound signal”, “digital song signal”, or something else? (similar term is also

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found on page 4, lines 4 and 14; page 7, lines 10-11; page 1, line 11). It is noted that the abstract content of “a first portion of the digital speech signal is mixed with a first portion of the digital music signal to produce a digital sung signal” referred by the applicant (Remarks: page 10, paragraph 2), at most, is just an intended use for mixing digital speech and musical signals, not **clear/specific definition** of argued term of “digital sung signal” at all. It is also noted that “digital sung signal” is not commonly accepted/used term in the art and no clear definition of the term can be found in the specification, and in fact, the applicant’s argument also refused to directly answer what the term really is. The examiner further tried the text search for the limitation in USPTO database and NPL(Non-patent literature, but no definition or description can be found, which is confirmed that the limitation is not commonly accepted/used term in the art. According to MPEP (2111.01.IV), “an applicant is entitled to be his or her own lexicographer” by “clearly setting forth a definition of the term” and a special meaning assigned to a term “must be sufficiently clear in the specification that any departure from common usage would be so understood by a person of the experience in the field of the invention”. However, the applicant failed to do so. Therefore, it is believed that the maintaining the objection for this term is proper. Appropriate correction/clarification is required.

(ii) on page 6, lines 29-34, the statement “said (a) power peak corresponding to the fundamental frequency of a vowel” is not true, since a power peak only indicates one of harmonics and normally not the fundamental frequency. The examiner agrees that FFT can be used to detect “the presence of a power peak in the frequencies constituting the spectrum” (specification: page 6, line 29-25), but, the power peak does not mean or correspond to “the fundamental frequency”. The examiner’s own experience is evidenced that in most of time and

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with various reasons, a power peak is only an nth (wherein n is unknown) harmonic of a fundamental frequency or a formant frequency, so that the statement is incorrect and inefficient for obtaining fundamental frequency of the signal. In order to find a fundamental frequency, more process(es) need to be done, but the applicant did not disclose them. Appropriate correction/clarification is required.

***Claim Rejections - 35 USC § 112***

11. Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1 and 11, the claimed term “digital **sung** signal” (also included in claims 5-6, 10, 12, 16-17, 21) is indefinite, because it is unclear what the term really is. It is noted that “digital sung signal” is not commonly accepted/used term in the art and lacks clear definition/description in the specification. It is also noted that the abstract content of “a first portion of the digital speech signal is mixed with a first portion of the digital music signal to produce a digital sung signal” referred by the applicant (Remarks: page 12, paragraph 4), at most, is just an intended use for mixing digital speech and musical signals, not **clear/specific definition** of argued term of “digital sung signal” at all. In fact, no clear definition of the term can be found in the specification and the applicant’s argument also failed to specific answer what the term really is. The examiner further tried the text search for the limitation in USPTO database and NPL(Non-patent literature, but no definition or description can be found, which is confirmed that the limitation is not commonly accepted/used term in the art. According to

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MPEP (2111.01.IV), “an applicant is entitled to be his or her own lexicographer” by “clearly setting forth a definition of the term” and a special meaning assigned to a term “must be sufficiently clear in the specification that any departure from common usage would be so understood by a person of the experience in the field of the invention”. However, the applicant failed to do so. Therefore, it is believed that the claim rejection under 35 USC 112 2<sup>nd</sup> paragraph (indefinite) is proper.

Regarding claims 2-10 and 12-21, the rejection is based on the same reason as described for claims 1 and 11, because the dependent claims include or inherit the same or similar problematic limitation as their parent claim(s).

12. Claims 3-4 and 14-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claims 3 and 14, the claimed limitation “means for replacing the fundamental frequency of said speech signal by the fundamental frequency associated with a note of said music signal” lacks enablement to one of ordinary skill in the art based on the disclosure of the specification (see the closet disclosure of the specification: page 5, line 28 to page 6, line 34). This enablement problem is related three aspects.

Firstly, it is noted that the disclosure "said power peak corresponding to the fundamental frequency of a vowel" (page 6, line 31-32) is incorrect and inefficient to obtain a fundamental frequency of the signal, and nowhere in the specification specifically describes how to

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obtain/extract a fundamental frequency of the speech signal. The examiner agrees that FFT can be used to detect “the presence of a power peak in the frequencies constituting the spectrum” (specification: page 6, line 29-25), but, the power peak does not mean or correspond to “the fundamental frequency”. The examiner’s own experience evidenced that in most of time and with various reasons, a power peak is only an  $n$ th (wherein  $n$  is unknown) harmonic of a fundamental frequency or a formant frequency, so that extraction of a fundamental frequency is much more complicated than detecting a power peak. That is why the examiner stated that the recitation “is incorrect and inefficient to obtain a fundamental frequency of the signal”. The examiner has no disagreement that there is common technique (i.e. well known art) used in the art for the extraction the fundamental frequency via FFT. The problem is that the applicant **expressly** says the **incorrect** statement in the specification, so that the examiner has reasonable doubt and responsibility to challenge enablement of the claimed invention

Secondly, it is well known in the art that the range of fundamental frequency of human speech is much narrower than that of musical instruments, so that the replacement cannot be easily implemented by one of ordinary skill in the art without solving this range problem; otherwise, the replacement cannot be enabled or lacks meaningful operation. There is no evidence in the specification to specifically describe how to solve this problem. It is known in the art that the fundamental frequencies of both speech signal and music signal are dynamically changed in different range, speed and trend, so that the replacement, in actual and practical application, involves much more complicated alignments of fundamental frequency itself and its harmonics than just a simple replacement of one frequency with another as claimed. It is should be clear that this enablement issue is regarding the invention’s objective that is aimed to offer

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some meaningful service (specification: page 2, lines 20-23), **not** whatever mixed junk sound produced. For example, it cannot be enable one of skill in the art to replace a slow changed fundamental frequency around 100 Hz of a voiced speech signal having a first formant frequency around 300 Hz with a fast moved fundamental frequency between 500-1000 Hz of a music signal to provide meaningful service, even using “a simple replacement of one frequency with another”. Similar results are also applied to the situation of big difference(s) between speech and music signals in terms of various combinations of fundamental frequency range, speed and trend.

Thirdly, it is noted that the claim limitation (replacing frequency) conflicts with the specification disclosure that states “a proportion Y% of a **musical** sinusoidal signal deduced from the signal S2 **is substituted** for a proportion X% of the speech sinusoidal signal” (replacing percentage) (page 5, line 35 to page 6, line 2). In this case, the replacing frequency conflicts with replacing percentage of the sinusoidal signal because they cannot be compatible.

Therefore, considering all three aspects together, the claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention, **without undue experimentation**.

Regarding claims 3 and 15, the rejection is based on the same reason as described for claims 1 and 14, because the dependent claims include or inherit the same or similar problematic limitation as their parent claim(s).

***Claim Rejections - 35 USC § 103***

13. Claims 1-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE et al. (US 5,641,927) hereinafter referenced as PAWATE in view of BOSS et al. (US 5,915,237) hereinafter referenced as BOSS.

As per **claim 1**, as best understood in view of the rejection under 35 USC 112 2<sup>nd</sup> (see above), PAWATE discloses ‘autokeying for musical accompaniment playing apparatus (audio device)’ (title), comprising:

“input by the user of said audio device of an analog [speech] signal” (Fig.2, ‘user’s vocal’),

“converting said analog [speech] signal into a digital [speech] signal comprising at least one fundamental frequency” (Fig. 2 shows a microphone and ‘pitch (corresponding to fundamental frequency) estimator 23’),

“storing a set of coded data [representing a musical score comprising a set of notes, each note being defined by a fundamental frequency, a duration, and an instrument that plays said note]” (col. 2, lines 54-67, ‘the key (corresponding to pitch) of the music may also be stored in the CD data (set of coded data) field so not have to be computed’),

“extracting a digital music signal from said set of coded data” (col. 2, lines 54-67, ‘the pitch estimated and averaged from the original artist’s voice (musical signal), or key (corresponding to pitch) from the background music or that from the CD data field is compared (necessarily extracting music from the related data)’), and

“mixing a first portion of said digital [speech] signal and a first portion of said digital music signal to produce a digital [sung] signal” (col. 3, lines 1-40, ‘change the key (portion of

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music) of background music' and 'output (produce) to the mixer 13a to add the user's vocal (portion of the input digital signal; also see Figs, 2 and 2a).

It is noted that PAWATE does not expressly disclose the input digital signal being "speech signal" and the coded data "representing a musical score comprising a set of notes, each note being defined by a fundamental frequency, a duration, and an instrument that plays said note". However, this feature is well known in the art as evidenced by BOSS who discloses 'representing speech using MIDI (musical instrument digital interface)' (title), comprising well known feature of MIDI data for generating music including 'identifying a musical instrument (i.e. piano, clarinet) for music generation, turning on a note (reflecting a musical score) or altering a parameter in order to generate or control sound' (col. 2, lines 7-30), which necessarily/inherently includes parameter data of pitch (corresponding to fundamental frequency) and the related time stamps (corresponding to duration) for the music note; 'encoding a digitized speech into a standard digital format, such as MIDI' (col. 2, lines 67 to col. 3, line 5); and using 'a MIDI compatible signal' for processing and storing 'speech segments' in 'the phoneme dictionary' including parameters of 'pitch' and 'duration' (col. 5, line 45 to col. 6, line 28). BOSS also discloses 'mixer 204, ...receives a digitized speech signal...and a digitized music signal... and mixes the two signals together to form a single audio output' (col. 13, lines 30-45), which further supports the claim rejection. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify PAWATE by providing a compatible standard digital format, such as MIDI, for representing a speech and/or music signals, as taught by BOSS, for the purpose (motivation) of efficiently representing, storing and

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transmitting sound/audio signal(s) including music and/or speech signals (BOSS: col. 2, lines 27-29 and 56-61; col. 13, lines 58-61).

As per **claim 2** (depending on claim 1), PAWATE in view of BOSS further discloses “a digital signal processor comprising said means for mixing said first portions of said digital speech signal and said digital music signal” (PAWATE: col. 2, line 45 and Fig. 1, block 13).

As per **claim 3** (depending on claim 1), as best understood in view of the rejection under 35 USC 112 2<sup>nd</sup> and 1<sup>st</sup> (see above), it is noted that the combined references disclose using the mismatch between the two estimated pitches (corresponding to fundamental frequencies) of user and reference (background music) to change (substantially replace) the key (or pitch) of background music (PAWATE : col. 3, lines 1-16 and Figs. 2-2a), which is different from claimed “replacing the fundamental frequency of said speech signal by the fundamental frequency associated with a note of said music signal.” However, it would have been obvious to one of ordinary skill in the art to use the same mismatch to change (replace) user’s pitch instead of reference’s pitch in the same manner, so as to produce the predictable result of the user’s speech with a characteristic of the reference’s (music’s) pitch. It is noted that estimating and comparing pitches uses the same known technique (as taught by PAWATE), and changing (replacing) pitch from one to the other (i.e. from reference’s pitch to user’s pitch, or from user’s pitch to reference’s pitch) uses in the same known method, so that, one of ordinary skill in the art would have recognized that solving the difference based on the teachings of PAWATE in view of BOSS would have been obvious and the result would have been predictable as stated above.

As per **claim 4** (depending on claim 3), as best understood in view of the rejection under 35 USC 112 2<sup>nd</sup> and 1<sup>st</sup> (see above), PAWATE in view of BOSS further discloses “said

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fundamental frequency of said speech signal is replaced by said fundamental frequency associated with said note of said music signal during a period substantially equal to the duration of said note” (BOSS: col. 5, lines 1-47, since the speech encoded into MIDI compatible signal, the time stamp (inherent feature reflecting duration) of a note in music could be easily used to associate with the related phoneme duration, as claimed).

As per **claim 5** (depending on claim 1), as best understood in view of the rejection under 35 USC 112 2<sup>nd</sup> (see above), PAWATE in view of BOSS further discloses “adding to said digital [sung] signal a second portion of said digital speech signal” (PAWATE: col. 3, line 8 ‘to add the user’s vocal’ reads on second portion of said digital speech signal; col. 4, lines 13-56, ‘envelop’, ‘residual’ and ‘lpc’ can also be broadly interpreted as second portion of said digital speech signal).

As per **claim 6** (depending on claim 1), as best understood in view of the rejection under 35 USC 112 2<sup>nd</sup> (see above), PAWATE in view of BOSS further discloses “adding to said digital [sung] signal a second portion of said digital music signal” (PAWATE: col. 3, lines 1-16, wherein other music portions excluding key (or pitch) can be broadly interpreted as second portion of said digital music signal).

As per **claim 7** (depending on claim 1), PAWATE in view of BOSS further discloses “replacing at least one harmonic frequency of said fundamental frequency of said speech signal with a harmonic frequency of said fundamental frequency associated with a note of said musical signal” (PAWATE: col. 8, lines 1-4, ‘indicate second or third harmonic’; BOSS: col. 6, lines 29-53, ‘measure the pitch of the phoneme represented by the received phoneme pattern by...spectral compression and harmonic matching method’; col. 7, line 25 to col. 8, line 26, ‘MIDI standard’

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that inherently includes parameter for timbre (corresponding to harmonic)'; one of ordinary skill in the art would have recognized that the result of matching harmonic(s) could be used for changing (or replacing) certain harmonic(s) of the user or reference (music) in the same/similar way as for changing/replacing pitch, so that the output audio (result) would have a sound characteristic of harmonic(s) of the music (achieving predicable result), and vice versa).

As per **claim 10** (depending on claim 1), as best understood in view of the rejection under 35 USC 112 2<sup>nd</sup> (see above), PAWATE in view of BOSS further discloses "a vocoder for coding said [sung] signal" (PAWATE: col. 3, line 63, 'phase vocoder'; col. 4, lines 47-61, 'residual resampling method' with 'LPC' (vocoder feature); BOSS: 'the MIDI speech signal output...may transmitted over ...wireless communication, or telephone lines', so that one of ordinary skill in the art would have recognized that coding the processed signal would be the same as coding normal speech signal by using a vocoder).

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE in view BOSS applied to claim 1, and further in view of KAGEYAMA et al. (US 5,857,171) hereinafter referenced as KAGEYAMA.

As per **claim 8** (depending on claim 1), even though PAWATE in view of BOSS discloses "mixing said first portions of said digital speech signal and said digital music signal" as stated above (see claim 1), PAWATE in view of BOSS does not expressly disclose "discriminating a consonant from a vowel in said digital speech signal" and adapted to activate the mixing. However, the feature is well known in the art as evidenced by KAGEYAMA who discloses 'a vowel/consonant separator 40 (discriminator)' so that 'the consonant and vowel

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components can be separated (discriminated) from each other by detecting a fundamental frequency' and 'the vowel synthesizer 43 generates the vowel signal at the pitch specified by the pitch calculator based on the phoneme data distributed by the phoneme data register 48' (Fig.2 and col. 6, line 60 to col. 7, line 52), and teaches that 'the phoneme data track of the song data records only the vowel data of the original or model signer...', which suggests that the system is adapted to activate a mechanism for mixed signal (after envelope generator 44, Fig 2) during detection of the vowel, as claimed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify PAWATE in view of BOSS by providing a mechanism of separating vowel/consonant and activating a mixing process during detection of vowel, as taught by KAGEYAMA, for the purpose (motivation) of creating a harmony voice having a tone other than that of user (actual player, or karaoke singer) (KAGEYAMA: col. 1, lines 31-32).

15. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE in view BOSS applied to claim 1, and further in view of KAGEYAMA et al. (US 5,712,437) hereinafter referenced as KAGEYAMA2.

As per **claim 9** (depending on claim 1), PAWATE in view of BOSS does not expressly disclose "a **voice activity detector** controlling said means for mixing said first portions of said digital speech signal and said digital music signal." However, the feature is well known in the art as evidenced by KAGEYAMA2 who discloses 'if the detected state of the signing performance indicates a no voice period', some functions/structures 'are disabled' (col. 5, lines 43-55), which suggests that system has a mechanism of detecting voice activity (so as being a

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voice activity detector) and determining whether or not a function/component is disabled (so as controlling the function/component). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the mixing means disclosed by PAWATE and BOSS with a mechanism of detecting voice activity for controlling certain function/component as taught by KAGEYAMA2, for the purpose (motivation) of generating a harmony audio signal containing an additional harmony part and/or determining to stop(or start) to harmony sound generation (KAGEYAMA2: abstract and col. 5, lines 54-55).

16. Claims 11-18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE in view BOSS applied to claim 1, and further in view of TANIGUCHI et al. (US 5,712,437) hereinafter referenced as TANIGUCHI.

As per **claim 11**, as best understood in view of the rejection under 35 USC 112 2<sup>nd</sup> (see above), the rejection is based on the same reason described for claim 1 because the claim recites the same or similar limitations as claim 1, except the preamble limitation “a telecommunication terminal”. However, the feature is well known in the art as evidenced by TANIGUCHI who discloses ‘music player applicable to portable telephone terminal’ (title), comprising ‘portable telephone terminal (a telecommunication terminal) incorporating a music player device’, ‘CPU’ and ‘speech processor’ for ‘coding/decoding on speech signals’ and producing ‘hold sound mixed with received speech’ (col. 3, line 30 to col. 4, line 11). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify PAWATE in view BOSS by providing a portable telephone terminal and mixing sound with speech, as taught by TANIGUCHI, for the purpose (motivation) of generating BGM

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(background music) mixed with received speech signals for the system (TANIGUCHI: col. 16, lines 34-56).

In addition, in another view of teachings of PAWATE and BOSS, since PAWATE in view BOSS discloses using 'a computer system' implementing the MIDI encoding/decoding systems and including 'a modem for communicating with one or more other computers via the internet, telephone lines or other transmission medium' (BOSS: col. 11, line 58 to col. 12, line 16), the computer system can be broadly interpreted as claimed "a telecommunication terminal". This means that the disclosure by PAWATE in view BOSS can also satisfy the claim for the rejection, based on broadest reasonable interpretation of the claim in light of the specification.

As per **claim 12** (depending on claim 11), PAWATE in view of BOSS and TANIGUCHI further discloses "transmitting said digital sung (sound) signal to another terminal **in real time**" (TANIGUCHI: col. 9, lines 14-30).

Regarding **claims 13-18 and 21** (depending on claim 11), the rejection is based on the same reason described for claims 2-7 and 10, because the claims recites the same or similar limitations as claims 2-7 and 10 respectively.

17. Claim 19 is are rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE in view of BOSS and TANIGUCHI applied to claim 11, and further in view of KAGEYAMA.

Regarding **claim 19** (depending on claim 11), the rejection is based on the same reason described for claim 8, because the claims recites the same or similar limitations as claim 8.

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18. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE in view BOSS and TANIGUCHI applied to claim 11, and further in view of KAGEYAMA2.

Regarding **claim 20** (depending on claim 11), the rejection is based on the same reason described for claim 9, because the claims recites the same or similar limitations as claim 9.

### *Conclusion*

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QH/qh

May 26, 2009

/Qi Han/

Primary Examiner, Art Unit 2626